

REMARKS

Claims 1-6, 8, 9 and 22-38 are pending. Claim 7 is canceled without prejudice or disclaimer and claims 1, 3-6, 22, 26, 28-31, 35 and 37 are amended. A marked-up version showing the changes made by the present amendment is attached hereto as "**Version with markings to show changes made.**"

The title of the invention is not considered descriptive of the invention to which the claims are directed. The title is amended to read –Process for Fabricating Thin-Film Device–.

Claims 22-30 were rejected under 35 U.S.C. §112, first paragraph. In this rejection, the Examiner questions how a first oxide film can be formed on the conductor and washed without removing a second oxide film “that is on top of the first oxide film.” This rejection is respectfully traversed.

The Examiner’s attention is directed to the disclosure at page 27, lines 4-22, and the washing step at page 27, lines 23-31. In particular, the second oxide film is formed under the first oxide film. As such, it is believed that no amendment is required.

Claim 7 was rejected under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed.

The Examiner does not understand how the sides of the bus lines can be outwardly convex when they are also inclined. The disclosure at page 16, lines 14-30 discusses the subject matter of claim 7 (as incorporated into amended claim 1).

Claim 4 apparently is objected to as lacking sufficient antecedent basis. The Examiner's position, however, is somewhat inconsistent, and it appears that the Examiner may have become confused. More specifically, the unamended claims employ "the step" language for setting forth various steps. For example, although claim 4 is objected to by the Examiner for failing to provide proper antecedent basis for "the step for ashing", claim 4 also sets forth "the step for forming a mask." In view of this inconsistency, the claims have been amended to delete reference to "step."

Claims 1-4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. in view of Noumi et al. Zhang et al. is relied upon by the Examiner for teaching the basic features of the claims with the exception of the inclined sides of the bus lines and connection portions. Noumi et al. is applied by the Examiner for its disclosure of bus lines and a connection portion having inclined sides "to improve the coatability of the etched films." Favorable reconsideration of this rejection is earnestly solicited.

One of ordinary skill in the art would not have been motivated by the teachings Noumi et al. and modified Zhang et al. in the manner suggested by the Examiner. In this regard, the Examiner may have misunderstood the disclosure of Noumi et al. that the inclined sides provide improved coatability of the etched films. That is, it appears that the disclosure of Noumi et al. could be interpreted that improved coatability of the etched films is obtained by experimenting with the etching composition. Please see column 4, lines 42-57. It would not appear that this disclosure suggests that the tapered shape itself contributes to improving coatability, but instead to the particular composition, particularly in view of the admitted prior art of Noumi et al. which shows a tapered structure as well.

Without any particular reason to provide a tapered surface, it would not appear that one of ordinary skill in the art would have been motivated to make the modifications asserted by the Examiner. One of ordinary skill in the art would not have been motivated to change the surface of Zhang merely based upon the disclosure of a tapered surface.

In regard to claims 2 and 3, the Examiner argues that Noumi et al. discloses that the inclined sides can be adjusted by modifying the composition of the etchants. However, as noted above, it does not appear that Noumi et al. teaches such a relationship.

In regard to claim 4, the Examiner takes official notice that it would have been obvious to ash the unwanted mask material prior to etching. Since the art provides no suggestion for ashing prior to etching, there is no suggestion in the art to remove unwanted mask material by ashing so that the etching pattern can be clearly done on the conductor layer.

Claim 1 has been amended to incorporate the features of claim 7. For at least this reason and the reasons discussed above, amended claim 1 distinguishes over the cited references.

Claims 5, 6, 8 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang in view of Noumi and further in view of Angelopoulos et al. Angelopoulos et al. is applied by the Examiner for disclosure of a method for making patterns in TFT conductor layers wherein the mask is baked at a temperature not higher than 115°C prior to etching the conductor layer. The Examiner argues that it would have been obvious to modify the teachings of Zhang et al. and Noumi et al. so that the mask is baked at a temperature not higher than 115°C. This rejection is respectfully traversed.

Claim 5 requires that the temperature for baking the mask is set so that the mask will have a relatively small rigidity so that an outer portion of the mask is pushed up from the conducting layer due to a reaction gas in the etching step. The cited art provides absolutely no teaching or suggestion of such features. Although Angelopoulos et al. discloses a resist which is baked at 85°C, this disclosure alone would not suggest a relatively small rigidity so that an outer portion of the mask is pushed up from the conducting layer due to a reaction gas in the etching step.

The Examiner attempts to remedy the deficiency of the prior art teachings by arguing that the mask of the combination of references would have a relatively small rigidity and function in the same manner as claimed. However, the Examiner has failed to provide any reasons why one of ordinary skill in the art would have looked to the teachings of Angelopoulos et al. to employ a baking temperature as claimed. There must be some reason to motivate one of ordinary skill in the art to make the modifications urged by the Examiner.

Claims 31-36 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. in view of Noumi et al. This rejection is similar to the above-discussed rejection in that the Examiner acknowledges that Zhang et al. does not teach inclined sides of the bus lines and connection portions, and Noumi et al. is applied for its disclosure of inclined sides. This rejection is respectfully traversed.

As noted above, one of ordinary skill in the art would not have been motivated to change the surface of Zhang merely based upon the disclosure of a tapered surface.

Claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. in view of Noumi and further in view of Bae et al. In this rejection, the Examiner acknowledges that

U.S. Patent Application Serial No. 09/761,753

Zhang et al and Noumi et al. do not teach that etching is anodic milling or dry-etching. Bae et al. is applied by the Examiner for its disclosure of a dry-etch composition to form inclined electrodes. Bae et al. fails to provide the teachings which the primary combination of references to Zhang et al. and Noumi et al. lacks. Accordingly, for the same reasons discussed above, claim 37 is patentable.

Claim 38 was rejected under 35 U.S.C. §103(a) as being unpatentable over Zhang et al. and Noumi et al. further in view of Wolf et al. Favorable reconsideration is earnestly solicited.

Wolf et al. fails to provide the teachings which the primary references lack. As such, claim 38 is patentable over the cited references.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

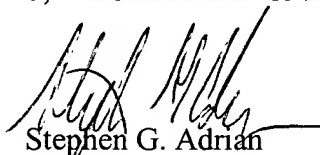
Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned attorney.

U.S. Patent Application Serial No. 09/761,753

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP


Stephen G. Adrian
Attorney for Applicant
Reg. No. 32,878

SGA/arf

Atty. Docket No. **980307A**
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Petition for Extension of Time

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VERSION WITH MARKINGS TO SHOW CHANGES MADE 09/761,753

IN THE CLAIMS:

Claims 1, 3-6, 22, 26, 28-31, 35 and 37 have been amended as follows:

1. (Amended) A process for fabricating a thin-film device, said process comprising [the steps of]:

forming a conducting layer composed of an anodically oxidizable metal on a substrate;

etching said conducting layer to form a plurality of bus lines having upper surfaces parallel to said substrate and inclined side surfaces and connection portions electrically connected to said bus lines and having upper surfaces parallel to said substrate and inclined side surfaces, the side surfaces of said bus lines and the side surfaces of said conduction portion are outwardly convex;

anodically oxidizing said bus lines and said connection portions so that said bus lines and said connection portions include inner conducting portions and outer insulating oxide films covering said inner conducting portions, respectively.

3. (Amended) A process according to claim 2, wherein said etching [step] is carried out so that the side surfaces of said bus lines and the side surfaces of said connection portions are inclined at angles within the range from 30 degrees to 50 degrees, an average, with respect to said

substrate.

4. (Amended) A process according to claim 1, further comprising [the step for] forming a mask on said conducting layer prior to said etching [step], and [the step for] ashing said substrate including said mask between said mask forming [step] and said etching [step].

5. (Amended) A process according to claim 1, further comprising [the step for] forming a mask on said conducting layer and [the step for] baking said mask prior to said etching [step], wherein the temperature for baking said mask [in said baking step] is so set that said mask will have a relatively small rigidity so that an outer portion of said mask is pushed up from said conducting layer due to a reaction gas in said etching [step].

6. (Amended) A process according to claim 5, wherein the temperature for baking said mask [in said baking step] is not higher than 115°C.

22. (Amended) A process for fabricating a thin-film device, said process comprising [the steps of]:

forming a conducting layer composed of an anodically oxidizable metal on
a substrate;

etching said conducting layer in a predetermined shape;

forming a second oxide film on said conducting layer by anodic oxidation

after a first oxide film with a thickness is formed on said conducting layer; and

washing said substrate, whereby said first oxide film is removed by said washing and said second oxide film is not removed by said washing but remains on said conducting layer so as to cover said conducting layer.

26. (Amended) A process according to claim 22, wherein said washing [step] is executed using ultrasonic waves of not lower than 200 KHz.

28. (Amended) A process according to claim 27, further comprising [a step for] forming an insulating film on said substrate and [a step for] forming a semiconductor layer on said substrate after the second oxide film has been formed, wherein the [step for] etching of said conducting layer forms gate electrodes and gate wirings.

29. (Amended) A process according to claim 27, further comprising [a step for] forming a semiconductor layer on said substrate and [a step for] forming an insulating film on said substrate prior to forming said conducting layer, wherein the [step for etching] of said conducting layer forms gate electrodes and gate wirings.

30. (Amended) A process according to claim 22, wherein the [step for] etching of said conducting layer forms gate electrodes having upper surfaces parallel to said substrate and inclined side surfaces.

31. (Amended) A process for fabricating a thin-film device, said process comprising [the steps of]:

forming a semiconductor layer having a predetermined shape on a substrate;

forming an insulating film on said substrate to cover said semiconductor layer;

forming a conducting layer composed of an anodically oxidizable metal on said substrate in such a shape as to cover a portion of said semiconductor layer and to form gate electrodes having upper surfaces parallel to said substrate and inclined side surfaces;

anodically oxidizing said gate electrodes;

forming said insulating film into a predetermined shape using said gate electrodes including the anodically oxidized film as a mask; and

injecting impurities into said semiconductor layer using said gate electrodes including said anodically oxidized film and said insulating film as a mask to form an offset in said semiconductor layer.

35. (Amended) A process according to claim 31, wherein said semiconductor layer comprises a polycrystalline [silicone] silicon.

37. (Amended) A process according to claim 31, wherein [the step for] forming said gate electrodes comprises [the step for] forming a gate electrode layer and [the step of] patterning the gate electrode layer based on either ionic milling or dry-etching.